

**Portable Equipment Application.**  
**Notebook Application.**

**Features**

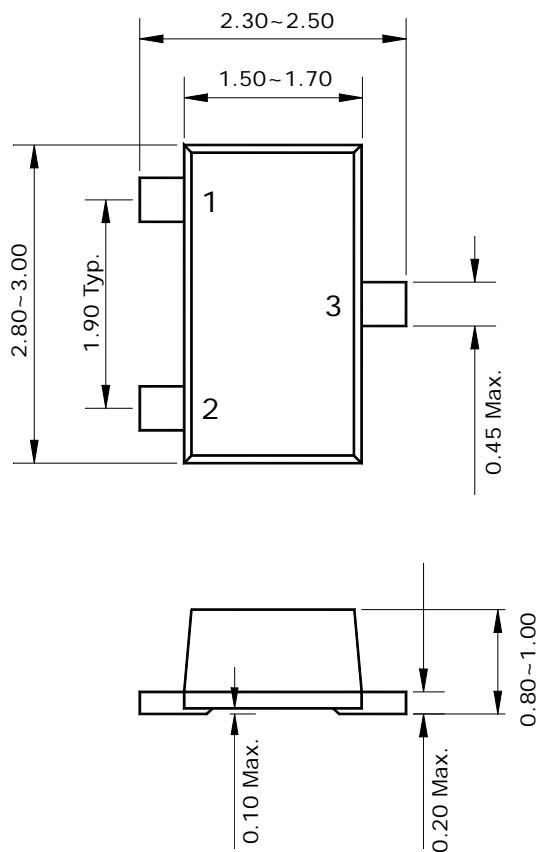
- Low  $V_{GS(th)}$  :  $V_{GS(th)}=0.6\sim 1.2V$
- Small footprint due to small package
- Low  $R_{DS(ON)}$  :  $R_{DS(ON)}= 27m\Omega$  (Typ.)

**Ordering Information**

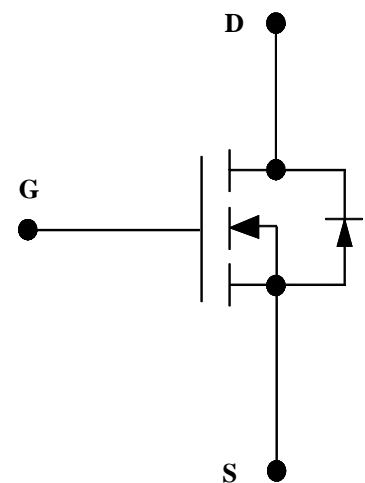
Type NO.	Marking	Package Code
STK003SF	K03	SOT-23F

**Outline Dimensions**

unit : mm



**Block Diagram**



**PIN Connections**

1. Gate
2. Source
3. Drain

## Absolute maximum ratings

(Ta=25°C)

Characteristic	Symbol	Rating	Unit
Drain-source voltage	$V_{DSS}$	30	V
Gate-source voltage	$V_{GSS}$	±12	V
Drain current (DC) **	$I_D$	3.6	A
Drain current (Pulsed) *	$I_{DP}$	14.4	A
Total Power dissipation **	$P_D$	0.35	W
Avalanche current (Single) ②	$I_{AS}$	3.6	A
Single pulsed avalanche energy ②	$E_{AS}$	14	mJ
Avalanche current (Repetitive) ①	$I_{AR}$	4.3	A
Repetitive avalanche energy ①	$E_{AR}$	1.3	mJ
Junction temperature	$T_J$	150	°C
Storage temperature range	$T_{stg}$	-55 ~ 150	

\* Limited by maximum junction temperature

\*\* Device mounted on a glass-epoxy board

Characteristic		Symbol	Typ.	Max	Unit
Thermal resistance	Junction-ambient	$R_{th(J-a)}$ **	-	357	°C/W

## N-CH Electrical Characteristics

(Ta=25°C)

Characteristic	Symbol	Test Condition	Min.	Typ.	Max.	Unit	
Drain-source breakdown voltage	$BV_{DSS}$	$I_D=250\mu A, V_{GS}=0$	30	-	-	V	
Gate threshold voltage	$V_{GS(th)}$	$I_D=250\mu A, V_{DS}=V_{GS}$	0.6	-	1.2	V	
Drain-source cut-off current	$I_{DSS}$	$V_{DS}=20V, V_{GS}=0V$	-	-	1	$\mu A$	
Gate leakage current	$I_{GSS}$	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	$\pm 10$	$\mu A$	
Drain-source on-resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=1.8A$	-	27	40	m $\Omega$	
		$V_{GS}=2.5V, I_D=1.8A$	-	39	78	m $\Omega$	
Forward transfer conductance ④	$g_{fs}$	$V_{DS}=5V, I_D=3.6A$	-	11.8	-	S	
Input capacitance	$C_{iss}$	$V_{GS}=0V, V_{DS}=10V, f=1MHz$	-	373	-	pF	
Output capacitance	$C_{oss}$		-	68	-		
Reverse transfer capacitance	$C_{rss}$		-	45	-		
Turn-on delay time	$t_{d(on)}$	$V_{DD}=10V, I_D=3.6A, R_G=10\Omega$	-	3.6	-	ns	
Rise time	$t_r$		-	5.1	-		
Turn-off delay time	$t_{d(off)}$		③④	-	24		-
Fall time	$t_f$		-	5.1	-		
Total gate charge	$Q_g$	$V_{DD}=10V, V_{GS}=4.5V, I_D=3.6A$	-	8.8	13	nC	
Gate-source charge	$Q_{gs}$		③④	-	0.9		1.4
Gate-drain charge	$Q_{gd}$		-	-	1.8		2.7

## Source-Drain Diode Ratings and Characteristics

(Ta=25°C)

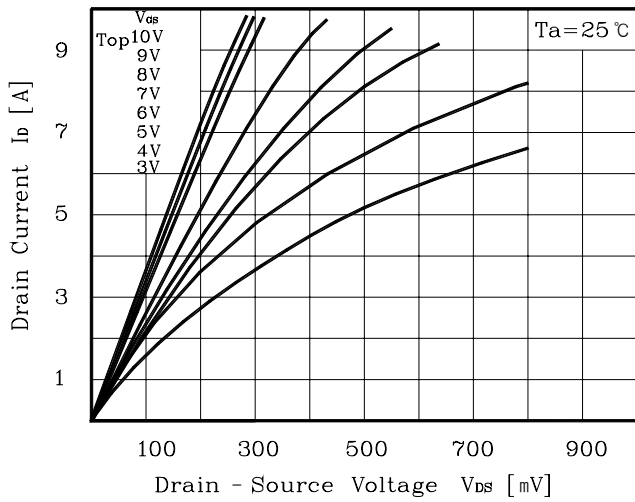
Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Source current	$I_S$	Integral reverse diode in the MOSFET	-	-	0.5	A
Source current (Plused) ①	$I_{SM}$		-	-	2.0	
Forward voltage ④	$V_{SD}$	$V_{GS}=0V, I_S=3.6A$	-	0.7	1.2	V
Reverse recovery time	$t_{rr}$	$I_S=3.6A, V_{GS}=0V, dl_S/dt=100A/us$	-	26	-	ns
Reverse recovery charge	$Q_{rr}$		-	-	120	-

Note ;

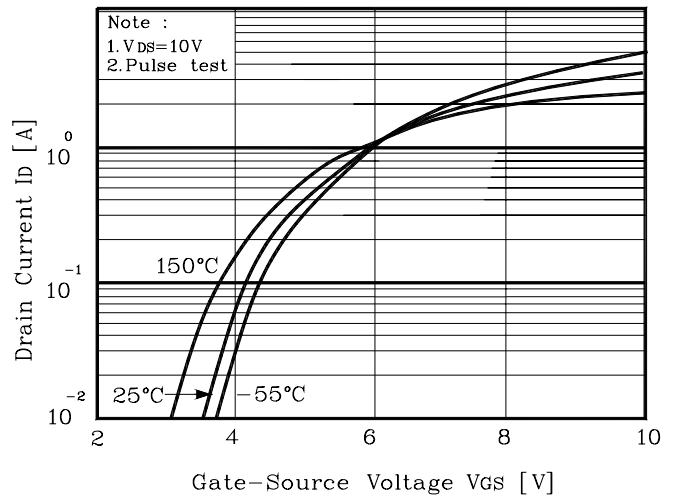
- ① Repetitive Rating : Pulse Width Limited by Maximum Junction Temperature
- ②  $L=1.0mH, I_{AS}=3.6A, V_{DD}=15V, R_G=25\Omega$
- ③ Pulse Test : Pulse Width < 300us, Duty cycle  $\leq 2\%$
- ④ Essentially independent of operating temperature

## N-CH Electrical Characteristic Curves

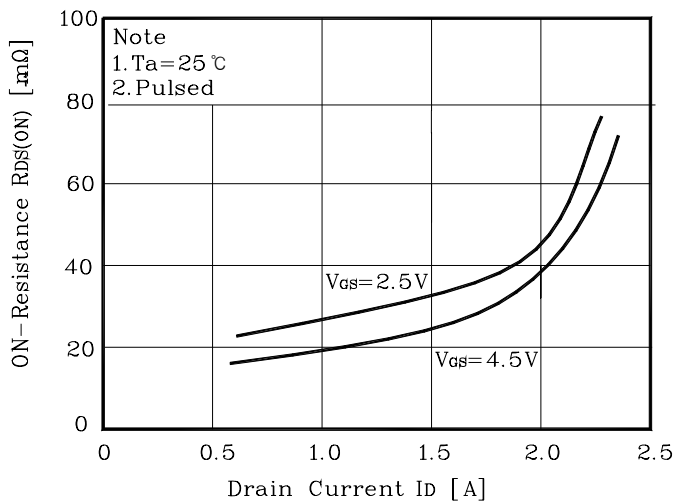
**Fig. 1  $I_D - V_{DS}$**



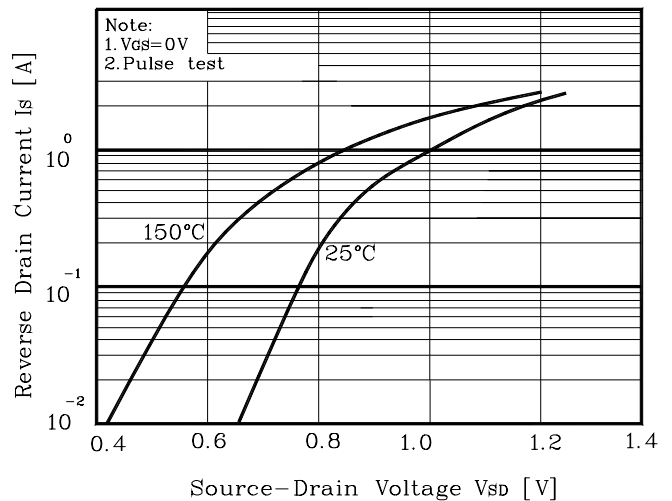
**Fig. 2  $I_D - V_{GS}$**



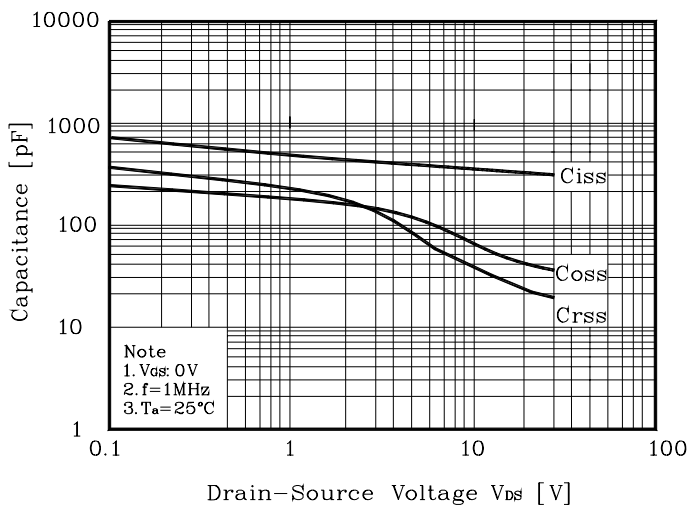
**Fig. 3  $R_{DS(on)} - I_D$**



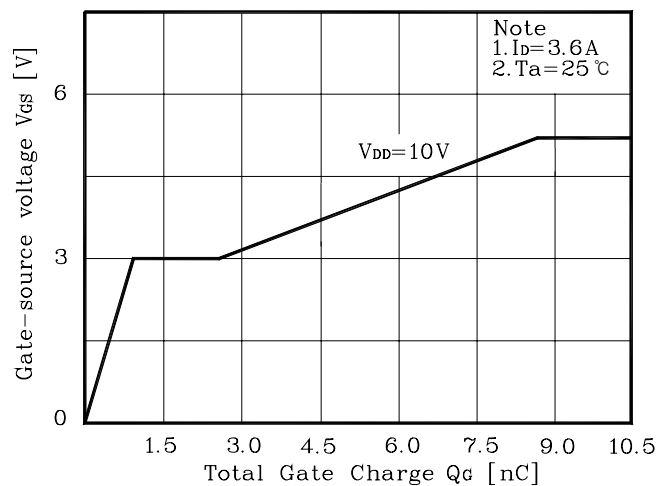
**Fig. 4  $I_S - V_{SD}$**



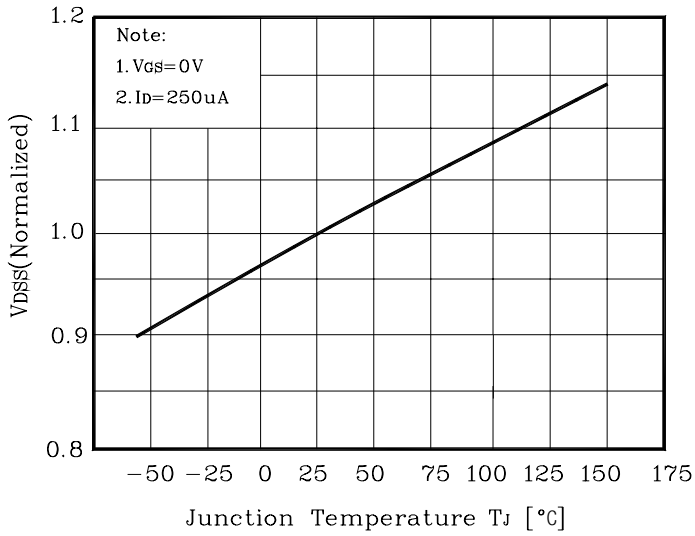
**Fig. 5 Capacitance -  $V_{DS}$**



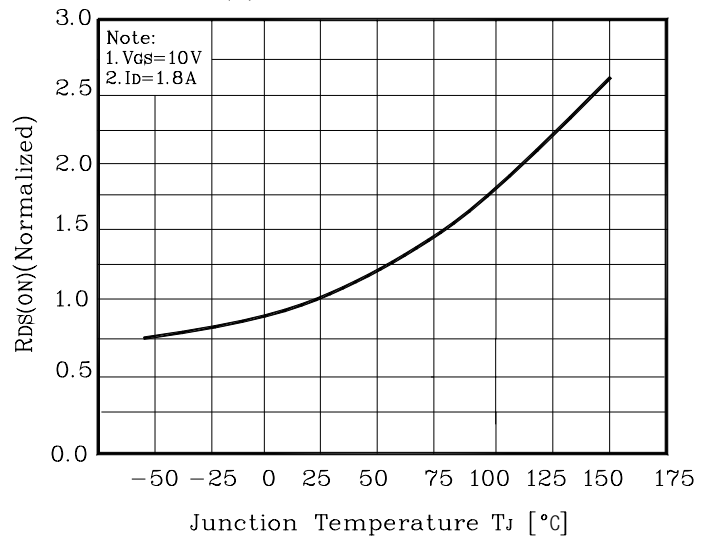
**Fig. 6  $V_{GS} - Q_G$**



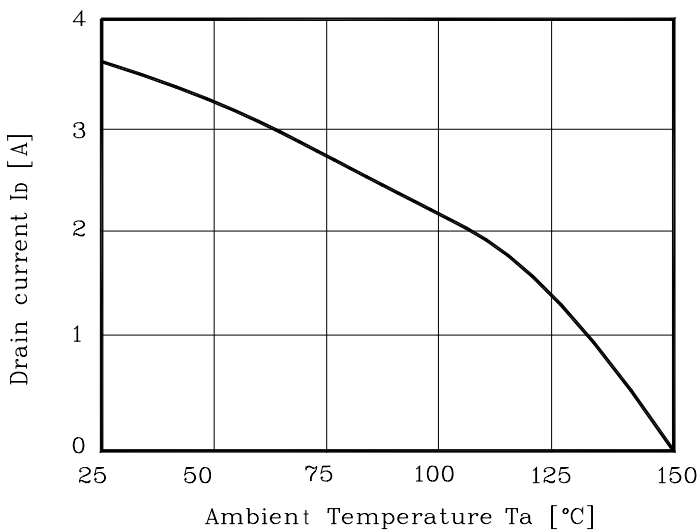
**Fig. 7  $V_{DSS} - T_J$**



**Fig. 8  $R_{DS(on)} - T_J$**



**Fig. 9  $I_D - T_a$**



**Fig. 10 Safe Operating Area**

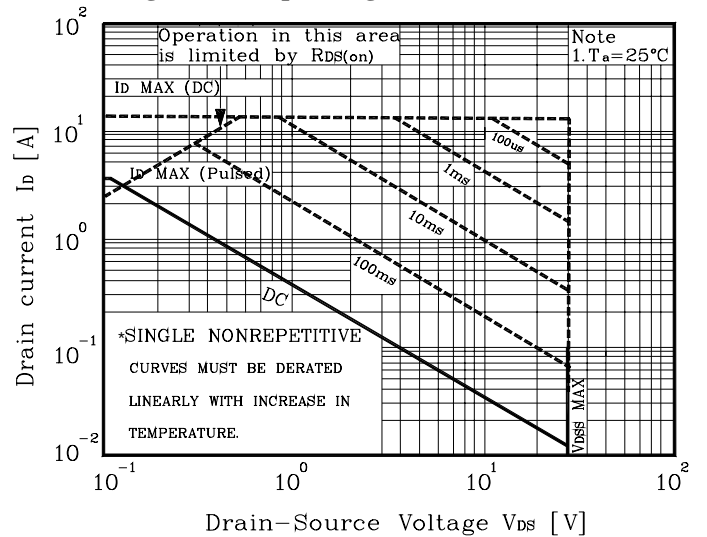


Fig. 11 Gate Charge Test Circuit & Waveform

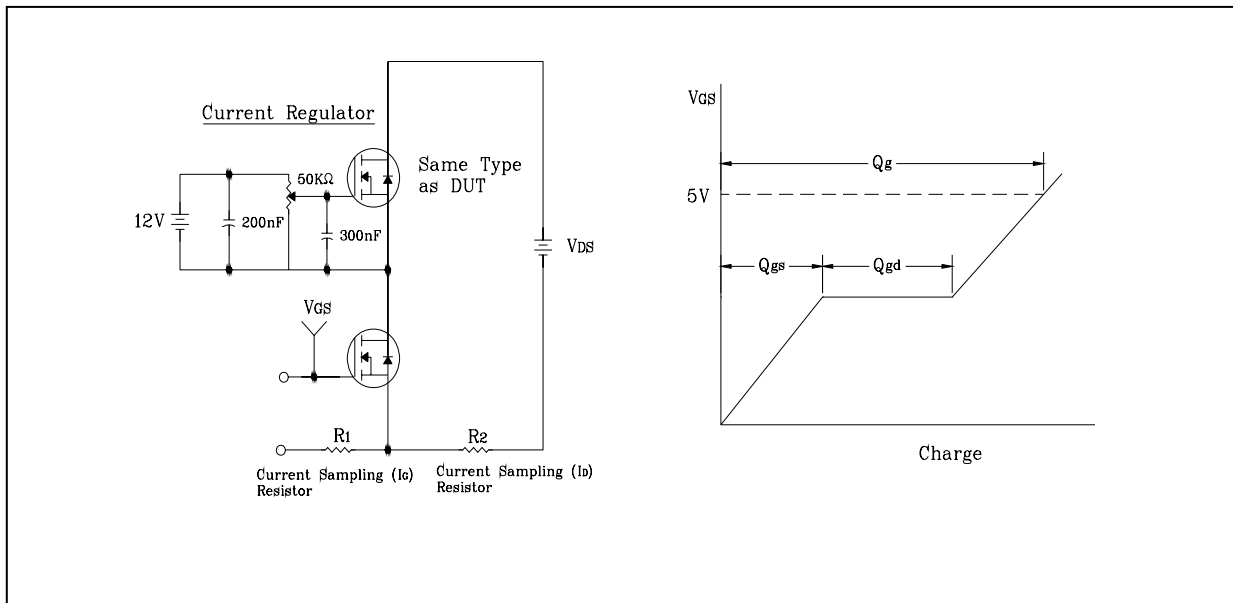


Fig. 12 Resistive Switching Test Circuit & Waveform

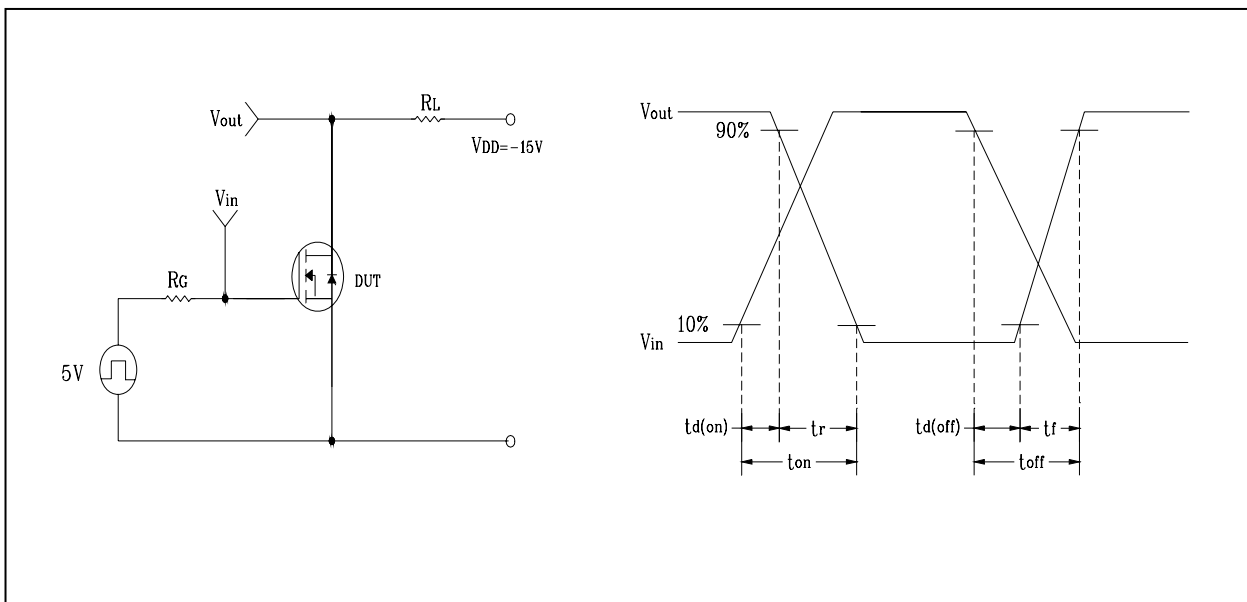


Fig. 13 E<sub>AS</sub> Test Circuit & Waveform

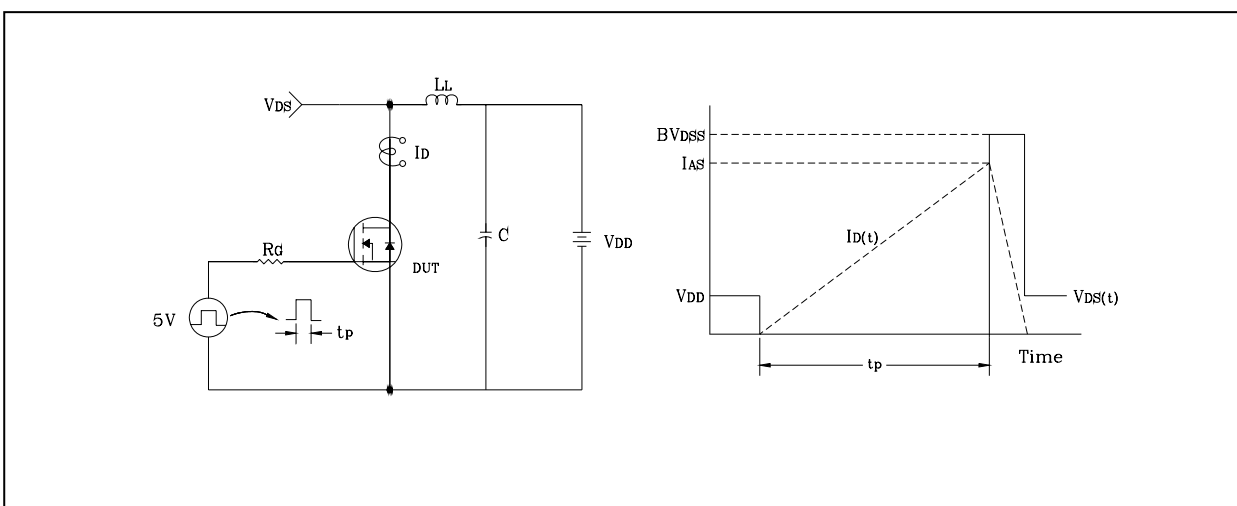
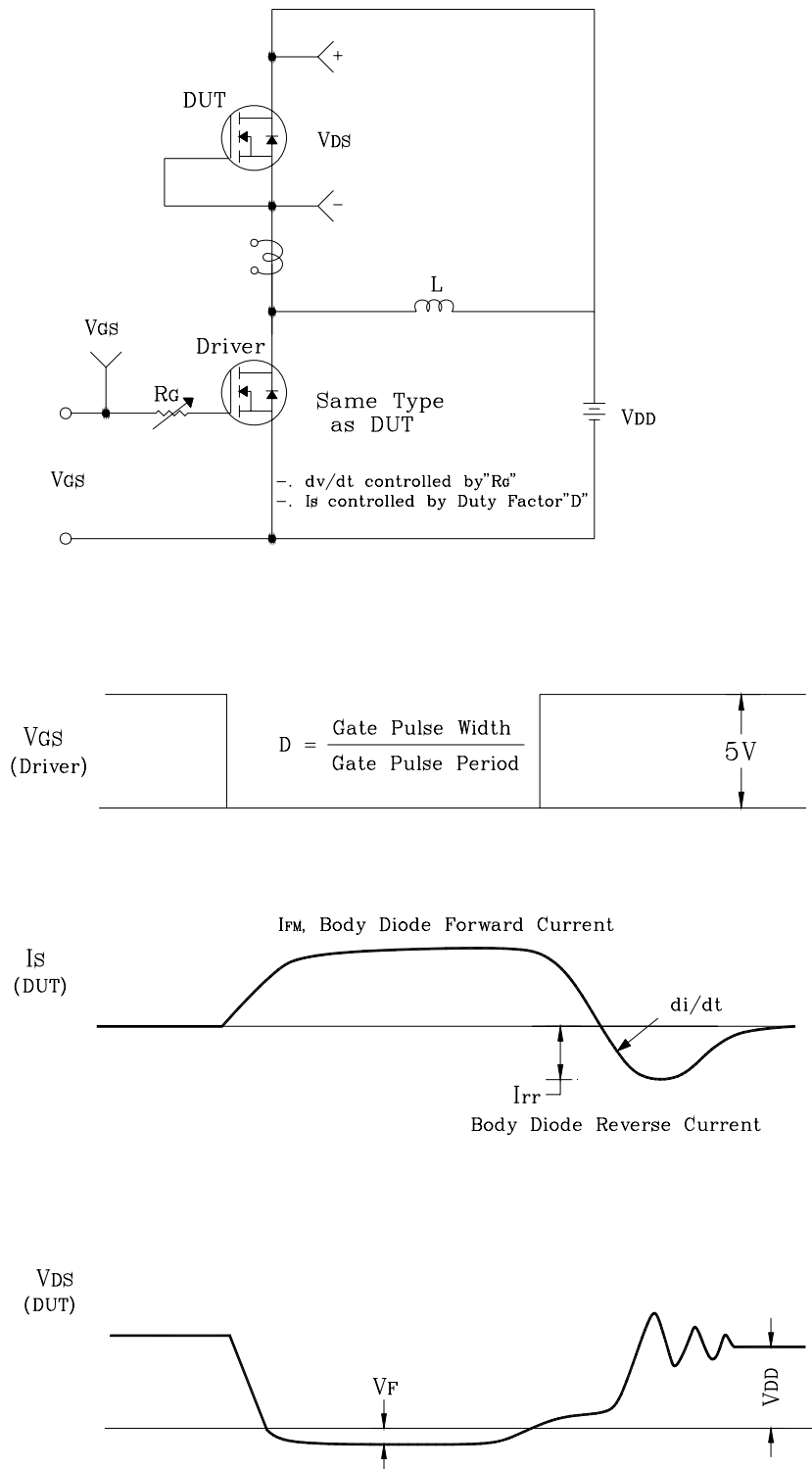


Fig. 14 Diode Reverse Recovery Time Test Circuit & Waveform



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